

REMARKS

Claims 1, 2, 5, and 14-18 remain pending in this application upon entry of this amendment. Independent claims 1 and 14 have been amended, and new claims 17 and 18 have been added. Support for the claim amendments may be found in the application at least at the following passages: page 9, line 20 to page 10, line 10; page 15, lines 3-19; and Figs. 3(a) and 3(b).) Claims 3, 4, and 6-13 were withdrawn pursuant to a previous election.

Favorable reconsideration is requested in view of the amendments and following remarks.

Rejections Under 35 U.S.C. § 103(a)

The claimed invention is a scribe line forming apparatus and related method. Aspects of the invention, as recited in claim 1 for example, include a vertical crack forming member, an impact force applying means, and heating and cooling means. The vertical crack forming member has a blade that forms a vertical crack to be an origination point of a scribe line by pressing the blade against the surface of a brittle substrate. The impact force applying means applies an abrupt impact force to the vertical crack forming member to generate the vertical crack. The scribe line is formed originating from this initial crack as a result of stresses generated by a temperature gradient created by the heating and cooling means.

Independent claims 1 and 14 have been amended to clarify the nature of the impact force applying means and its resultant abrupt impact force. Specifically, claim 1 has been amended to recite “an impact force applying means for applying an a single abrupt impact force to the blade”. A similar amendment has been made to claim 14.

Claims 1, 5, and 14-16 stand rejected pursuant to 35 U.S.C. § 103(a) as being obvious over Hoekstra et al. U.S. Patent No. 6,489,588 (Hoekstra) in view of Ishikawa et al., U.S. Patent No. 6,536,121 (Ishikawa).

The device of Hoekstra has a microcrack initiator 60 having a scribe wheel 62, a heating means 41 (a mirror that reflects a laser beam), and a cooling means 50 (a

quenching device). The Examiner equates these features with the claimed vertical crack forming member, heating means, and cooling means respectively. The Examiner recognizes that Hoekstra does not disclose an impact force applying means. The Examiner, however, concludes that Ishikawa discloses an impact force applying means, and that it would have been obvious to combine the impact force applying means of Ishikawa with the scribing apparatus of Hoekstra to arrive at the claimed invention.

Ishikawa discloses a purported improvement to a scribing apparatus that uses a vibrating cutting blade. In this vein, the device of Ishikawa is comparable to prior art devices described in the background of the current application that scribe using “a lifting and lowering mechanism”. (See Application at page 2, line 20 to page 3, line 12.) The Examiner states that Ishikawa discloses a scribing tool which vibrates or oscillates up and down (see figure 8 and abstract), varying the pressure applied to a substrate. The Examiner considers *each vibration* to constitute an abrupt impact. (Office Action at 3.)

Applicant respectfully disagrees with the Examiner’s application of Ishikawa. Applicant submits that vibrations are not the same as an abrupt impact comparable to what is claimed. As indicated in the current application, the “abrupt impact” is a single impact at the origination of the scribe line. (See, e.g., Application at page 15, lines 3-19.) Vibrations, i.e., a series of multiple impacts, should be not equated to an abrupt impact.

In addition, the devices of Hoekstra and Ishikawa operate based upon different scribing technologies. Hoekstra (and the claimed invention) employ a combination of heating and cooling beams to create stresses to form the scribe line, and a cutter or blade is used merely to form an initial crack. Indeed, element 60 in Hoekstra is termed a “microcrack initiator”. In contrast, the device of Ishikawa does not employ heating and cooling beams at all, but scribes with the vibrating cutting blade itself. One skilled in the art, therefore, would not apply the teachings of Ishikawa to the device of Hoekstra, insofar as the two devices scribe using different scribing technologies. “If the proposed modification or combination of references would change the principle of

operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.” MPEP § 2143.01 (VI), citing, *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). The claimed invention, therefore, is not obvious because to modify the device of Hoekstra based on the teachings of Ishikawa would alter the principle operation of Hoekstra.

The Examiner further states that it would have been obvious to combine Hoekstra and Ishikawa because a vibrating scribe wheel “allows for deep vertical cracks . . . without incurring damage on the work surface.” (Ishikawa at col. 2, lines 2-3.) Applicant submits that the Examiner has misinterpreted Ishikawa in this respect. At this passage, Ishikawa states that *it is an object of the invention* to “substantially eliminate defects and drawbacks encountered in the prior art systems to provide a scribing apparatus for forming deep vertical cracks along a scribe line without occurring damage on the work surface.” Ishikawa notes that vibrating scribing cutters may cause damage on the substrate surface and horizontal cracking. (See Ishikawa at col. 1, lines 19-24.) Ishikawa reduces such damage by using magnetic forces to add a static or dynamic load to the vibrating cutter. (See, e.g., Ishikawa at col. 2, lines 18-49.) In other words, it is not the vibrating cutter that eliminates substrate damage, as stated by the Examiner. Rather, it is the use of the magnetic-based loads that does so. The passage cited by the Examiner, therefore, does not suggest that the use of a vibrating cutter may improve scribing in the device of Hoekstra.

Indeed, Ishikawa teaches away from employing a single abrupt impact as claimed. Ishikawa states that the application of a “static load” can create horizontal cracking. (Col. 1, lines 57-60.) Similarly, “applying a static load to the work by using a plate spring” may impede the formation of the scribe line under certain conditions. (Col. 1, lines 47-51.) These passages suggest against using a single, abrupt force as recited in the claims.

Accordingly, independent claims 1 and 14 have been amended to clarify the distinction between employing an abrupt impact force to initiate scribing, as claimed, from scribing with a vibrating cutter as disclosed in Ishikawa. Specifically, claim 1 has

been amended to recite “an impact force applying means for applying an a single abrupt impact force to the blade”. A similar amendment has been made to claim 14.

In addition, new claims 17 and 18 have been added to recite specific features of the impact force applying means and the related portion of the method. (See Application at page 9, line 20 to page 10, line 10; page 15, lines 3-19; Figs. 3(a) and 3(b).) The device of Ishikawa does not disclose or suggest the features of the new claims, insofar as the device of Ishikawa does not employ a single, abrupt impact force to initiate scribing.

For at least the foregoing reasons, claims 1, 2, 5, and 14-18 are not obvious over Hoekstra in view of Ishikawa, and therefore the rejection of these claims should be withdrawn.

Status of Claim 2

Initially, Applicant requests clarification of the status of claim 2. In the response to the previous restriction requirement, Applicant indicated that claim 2 is an apparatus claim that corresponds in some respects to elected method claims 14 and 15. Applicants, therefore, requested consideration of claim 2 in addition to apparatus claims 1 and 5. (See Response dated February 21, 2008.)

In the current Office Action, the Examiner has indicated that claim 2 has been withdrawn without commenting on Applicant’s previous remarks that claim 2 should be considered. Applicant submits that claim 2 should be subject to examination, and therefore requests clarification on this issue.

Conclusion

Accordingly, claims 1, 2, 5, and 14-18 are believed to be allowable, and the application is believed to be in condition for allowance. A prompt action to such end is respectfully requested.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should additional fees be required in connection with this response (including

any additional claim fees), the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

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